

Amendments to the Specification:

On page 3, after line 2, please insert the following one sentence paragraph:

-- Figure 8 shows a cross-section of a further embodiment. --

Please replace the paragraph beginning on page 3, line 6 with the following amended paragraph:

-- Figure 1 shows a schematic of a preferred embodiment of the invention. A silicon ~~chip 10~~ chip 26 is connected by two pads to loop antenna 12 printed on the tag substrate. Figure 3 shows a layout of the "tag" made by the process of the alternate embodiment. The loop antenna consists of two or more turns of metal pattern 20 ending in two pads 22 across which is mounted a Si chip 26 active side down (i.e., the bonding pads on the chip 26 touch pads 22). Figure 4 shows a cross section of a preferred embodiment of the invention. Substrate 30 is the mechanical carrier or support. It preferably is not metal as this would raise losses in the reception and transmission of r.f. energy. Typical substrates that are inexpensive are PET film, PEN film, paper, glass epoxy and the like. If PET is used, an anti-static layer can be used to enhance the electrostatic transfer of metal toner to its surface. If paper is used, an adhesion layer 32 is preferably used to fill the pores and fiber cavities of the paper and provide adhesion for the metallic toner particles to the substrate. In either case the adhesion layer preferably includes a resin to promote low temperature processing of the silver toner into a solid metal conductor. A typical and preferred resin is selected from the DOW chemical series of Saran™ resins though other resins have worked well.--

Please replace the paragraph beginning on page 3, line 24 with the following amended paragraph:

-- On top of the anti-stat/adhesion layer 32, conductor patterns 34 are printed by means of electrostatic printing of metal toners on the anti-stat surface. Typical metal toners include copper, silver, aluminum and gold, with silver being a preferred toner. After drying of the liquid toner hydrocarbon diluent, the metal toner is sintered by heating to a temperature compatible with the upper temperature limit of the substrate. In one embodiment, after drying the toner, the silicon chip 26 is placed on the dried powder silver toner, bonding pads

down onto the silver toner pattern. Now the entire assembly is sintered whereby the silver particles sinter into a solid mass and sinter themselves to the bonding pads of the chip. Thus the metal traces are sintered and the silicon chip is bonded to the pads in a single step. This achieves a significant cost advantage over other production methods.--

Please replace the paragraph beginning on page 4, line 15 with the following amended paragraph:

-- Figure 2 illustrates a tag utilizing the transformer coupling aspect of the invention. In the device of Figure 5 a typical 4 turn antenna 28, comprising loops of a first layer of metal toner 50 having two end points 54, 56, is printed on the edges of the "tag". A clear dielectric cross over layer 52 is placed over the section of the tag where the end points 54, 56 are located. This allows for subsequent layer of patterned metal toner 58 to be printed on the cross-over layer without making electrical contact with the underlying toner pattern 50. The area of the dielectric layer above the end points 54, 56 is either removed or is not placed with the rest of the dielectric layer, to enable an electrical connection to the end points 54, 56. Now a the second layer of metal toner 58 in the form of one or more loops having end points located directly above, and so connected to, end points 54 and 56 is placed on the dielectric layer thereby completing the circuit and forming a winding for an air core transformer. In summary, the three layers; a first layer of metal toner 50, dielectric layer 52, and top metal toner layer 58 make an electrically continuous loop consisting of a large area antenna, 50, 28 and a transformer winding, 58, 26 24.--

Please replace the paragraph beginning on page 4, line 33 with the following amended paragraph:

-- Figure 6 shows the 2nd layer of metal toner 58 co-located over a segment of the 1st layer of metal toner 50 to form the coil 24. To complete the transformer coupling with the silicon chip 26, the chip 26 contains an output transformer coil 24 23, as shown in figure 2, and is mounted directly above the coil 50, 28, 58, 26 24 on the substrate. While the location of the chip 26 is not as critical as when mounting and physically and electrically connecting the chip to the metal toner circuit, it is preferred, to increase efficiency of signal/power transfer,

to place the chip as close to the substrate coil 24 as possible, for example, within the locations ~~X-X, 60~~ and ~~Y-Y 62~~ bounded by the rectangle 61. --

Please replace the paragraph beginning on page 5, line 8 with the following amended paragraph:

-- Figure 7 shows a cross section of a transformer coupling embodiment. Substrate 30 has an antistat/adhesion layer 32 and printed thereon a first metal layer ~~70~~ 50, and a dielectric cross over layer ~~72~~ 52. A second metal layer ~~74~~ 58 completes the circuit as shown in Figure 5. In a preferred embodiment the first metal layer 50 includes both the antenna 28 loops and an additional transformer 24 loop or portion thereof ~~loop~~. The second metal layer 58 includes one or more transformer 24 loops, which, when connected to the transformer 24 loop, or portion thereof, on the first metal layer 50, forms a transformer 24 coil have two or more loops. Adhesive layer ~~76~~ 68 is placed on the second metal layer ~~74~~ 58 and bonds chip ~~78~~ 26 in close proximity to the transformer 24 winding ~~58, 26~~. The thickness of the adhesive layer ~~76~~ 68, typically about 5 microns or less, is small compared to the area (x-x, 60; and y-y, 62), of the primary transformer coil which is preferably of the order of about 250x250 microns or more. This assures efficient transfer of energy from the antenna to the chip and from the chip out to the antenna.--

Please replace the paragraph beginning on page 5, line 22 with the following amended paragraph:

-- Encapsulating layer 28, shown in figure 4, protects the device from the environment and may also have a planarizing effect on the entire structure of the device.

Please replace the paragraph beginning on page 6, line 1 with the following amended paragraph:

--Substrate ~~90~~ 30 with etched metal pattern 92, has imaged on its electrode pads 94, conductive adhesive dots 94 96. Over this die 96 26 is accurately placed so that the electrodes on die 96 26, not shown, align with pads 94. Heating to achieve re-flow or setting of adhesive 94 96 is applied as necessary.